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Diverse student bodies and diverging performance trajectories

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prior educational experience;
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Abstract

Recent research suggests there is a divergence of performance between UK and Chinese students as they progress through their degree. The current study uses a large dataset that includes sufficient detail to enable us to categorise students according to their previous educational experience to test for differential progression trajectories across a broader range of categories. We find that students who progress with identical grades subsequently experience a systematic divergence of performance that depends on the subject they are studying and their previous educational experience. Not only are inferior performance trajectories not restricted to Chinese students, but for more quantitative courses the performance of Chinese students frequently progresses at a rate that is comparable or superior to UK and other international students. The results not only contribute to our understanding of student achievement, but they also have practical implications for student recruitment, curriculum design and student support.

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Introduction

In an important recent study, Crawford and Wang (2015) compare the performance of UK and Chinese students as they progress through their Bachelor degree and find that Chinese students outperform their UK counterparts during the first year but significantly underperform during the second and third years. This finding poses a challenge to the University sector, not least because of its responsibility to the large number of Chinese students who come to the UK and other western countries to study for a degree. It also raises a question of whether this divergence of performance is unique to Chinese students or whether other easily categorised students also experience markedly different levels of improvement as they progress through their undergraduate studies.

Numerous studies have considered the determinants of degree performance but the idea of diverging performance amongst different groups of students as they progress through their degree has been little studied prior to Crawford and Wang (2015)¹. The specific issue of diverging performance is important not only for providing a different dimension to considering performance per se and therefore improving our understanding of the determinants of degree performance, but also to help our understanding of the requirements and implications for student support that results from the increasing diversity of the student body that is evident in universities not just in the UK but globally, be it through internationalisation or widening participation.

The current study uses a relatively large dataset from a UK business school that includes sufficient detail to enable us to categorise individual students according to their previous educational experience and to test for differential progression trajectories. Our approach is designed to enable us to progress the work of Crawford and Wang by testing: a) whether there is predictable variation in the progression trajectories of different groupings of Chinese students according to their previous educational experiences; and b) whether other clearly defined groups of students experience different progression trajectories throughout their university studies. Our results demonstrate the importance of subject studied, with all overseas students studying courses based on predominantly discursive assessments experiencing inferior progression trajectories compared to British A-level students. Most strikingly, Chinese students progress at similar rates to that of non-Chinese students. The picture for quantitative courses is more complex with smaller differentials and some categories of overseas students achieving comparable performance trajectories to British A-level students.

Why specific groups of students experience diverging performance

A stylised view of the stages of a three year UK degree is that the first year is a comparatively gentle introduction to subject specific material allowing students, most of who

will be living away from home for the first time, to adapt to independent living and learning. Provision is often tied to specific textbooks and the subject material covered during this period is usually quite general and will be accompanied by much of the taught study skills that are provided as part of the degree. As students progress from year to year the material covered becomes more specialised as it focuses on the subject of their major and as a result becomes increasingly challenging as it draws on recent research within the discipline requiring students to make greater use of a variety of specialist texts and academic journals as opposed to introductory textbooks. At the same time, assessments become less descriptive and more conceptually demanding; for students to succeed it is critical that they are able to absorb themselves in the language of their discipline and clearly express themselves when writing essays. In summary, success beyond the first year is contingent on their ability to adopt appropriate learning approaches: independent or autonomous learning associated with 'deep' rather than 'shallow' approaches to learning (Entwistle & McCune, 2004). It is the contention of this study that students' capacity to adapt depends to some extent on their previous educational experiences.

A natural framework for considering the determinants of progression trajectories is provided by the literature on threshold concepts. According to Meyer and Land (2003; 2005), threshold concepts are associated with different ways of thinking and understanding about the subject of study and can be viewed as 'conceptual gateways' through which students must pass in order to fully progress in their studies. The learning of threshold concepts is characterised as 'troublesome', giving rise to what Meyer and Land describe as states of liminality in which students struggle and even flounder. Students progress at different speeds and with different levels of success through these gateways.

Preparation for higher education

It has often been suggested that the Chinese education system has traditionally favoured what can be described as a surface approach to learning that is characterised by rote learning, usually within a classroom situation, and consequently does not prepare students for the type of independent learning that is required in British and other international higher education institutions. While this would help explain why performance deteriorates as Chinese students progress to higher levels of study, the depiction of Chinese students as surface learners is not uncontroversial. Indeed, it has been suggested that not only are many of the negative perceptions of Chinese students as passive, surface learners based on misplaced stereotypes but they also reflect the difficulties that Western teachers have with the different study approaches adopted by Chinese students (Mathias et al., 2013). Moreover, it has been argued that the Western view of the role that rote learning plays within a 'Chinese approach' to learning is partial and it is a mistake to see it as a negative (Tan, 2011; Tweed & Lehman, 2002). Furthermore, the tendency of Chinese students to exhibit study characteristics associated with surface learning is not incompatible with those same students adopting deep approaches to study (Sakurai et al., 2014).

¹ One exception is the literature that evaluates the effect of work placements on degree performance by comparing the performance trajectories of students who take a placement with those who don't (see for example Mansfield 2011).

The question of preparedness for higher education can be posed for other clearly identifiable groups of students. Studies on the experience of UK students from lower socioeconomic backgrounds suggest that they are less prepared for making the transition to higher education, in particular they are less prepared for autonomous learning and dealing with what appears to be a less supportive teacher-student relationship, and they are often unsure of what is expected of them in assessments (see Thomas, 2011, for a survey). It is likely that these problems of adjustment are particularly acute for students entering higher education via the vocational route offered by Business and Technology Education Council (BTEC) qualifications which are usually associated with highly supportive routes to achievement.

Academic ability and language skills

Academic ability as measured by previous academic performance is likely to be a factor in determining differential trajectories through the stages of a degree since academically weaker students may perform well during the early stages when they are more likely to be working from single textbooks and benefitting from scaffolding that is likely to be in place, but as material becomes more conceptually challenging and the scaffolding removed, they face a greater risk of being left behind.

It has been suggested that the rapid growth in recruitment from China has been accompanied with a lowering of entry requirements which has resulted in greater diversity of both ability and commitment specifically of Chinese students (Lannelli & Huang, 2014). If true, this is a possible explanation, at least in part, for performance divergence. However, as with the other potential explanations, a decline in effective entry requirements is not likely to be unique to Chinese students. The growth in foundation colleges, whether aimed at home or overseas students, is likely to attract weaker students, as can the BTEC path into university. There is a substantial gap between the performance of BTEC and traditional entry students with Rouncefield-Swales (2014) reporting that 54.4% of BTEC students graduating in 2012/13 achieved a 'good degree' compared with 71.6% of traditional entry students (see also Shields & Masardo, 2015).

In addition to overall academic ability, the possession of specific skills can be crucial to success in higher education. In their series of papers on the subject of threshold concepts and troublesome knowledge, Meyer and Land (2003, 2005) and Land et al. (2005) highlight the importance of language and discourse.

It is hard to imagine any shift in perspective that is not simultaneously accompanied by (or occasioned through) an extension of the student's use of language. Through this elaboration of discourse new thinking is brought into being, expressed, reflected up and communicated. This extension of language might be acquired, for example, from that in use within a specific discipline, language community or community of practice, or it might, of course, be self-generated. It might involve natural language, formal language or symbolic language (Meyer & Land, 2005).

It is easy to see that students who are studying in a second language may well be disadvantaged in this respect since it is not only harder for such students to detect subtle nuances and changing meanings to subject specific vocabulary, but it is harder still to successfully adopt that language and at the same time make the subjective changes and cognitive leaps necessary for the subject they are studying. However, this may vary according to subject and it is conceivable that some students who have weaker discursive language skills may have strong quantitative language skills and are therefore relatively strongly equipped to communicate the language of mathematical relationships, including probability and risk, which places them at an advantage at acquiring threshold concepts for more formalistic and technical subjects taught within a business school setting.

There is a large literature demonstrating that a workload that is perceived by the student to be highly demanding encourages the adoption of a surface approach (see Baeten et al., 2010 for a survey) from which it is a small step to suggest that students studying in a foreign language or a new environment are facing a demanding workload and are therefore more likely to adopt surface approaches to learning (Sakurai, 2009; Sakurai et al., 2014). This problem is most acute for students who are both adjusting to living and studying in a foreign language but are also academically weaker than their peers. An illustration of this is the anecdotal observance of overseas students with weak grades who adopt self-defeating strategic approaches to study by foregoing in-session English support so they can focus on the modules that directly count to their degree (see also Kingston & Forland, 2008).

Data and Methodology

In contrast to previous studies, rather than analysing absolute levels of performance we use a methodology that allows us to compare the performances stage by stage conditional on performance in the preceding stage. The starting point shall be two regressions, one with the year 2 grade as the dependent variable and the other the year 3 grade with the primary independent variable being the grade achieved in the previous year, years 1 and 2 respectively, with dummy variables identifying different sub-groups. Accordingly, our results allow us to compare the second and third year performance of students conditional on the first and second year performances respectively.

$$Year2grade = \beta_0 + \beta_1 Year1grade + \beta_2 China + \text{dummies for other subgroups} + \text{controls}$$

$$Year3grade = \beta_0 + \beta_1 Year2grade + \beta_2 China + \text{dummies for other subgroups} + \text{controls}$$

Reliable data has been obtained for all students first registered to study for a degree at Essex Business School between the years 2009/10 through to 2012/13. From this data we obtain two samples which we label Second Year and Third Year. Because we are interested in evaluating how students' performance improves from one year to the next, for inclusion in our samples we require grades from both the year in question and the preceding year. Consequently, the

Second Year sample includes all students who undertook the second year of a Bachelor's degree between 2010/11 and 2013/14 for whom we have a grade for both their first and second years. The Third Year sample includes all students who undertook the third year of a Bachelor's degree between the years 2011/1 and 2013/14 for whom we have grades for both their second and third years, but not necessarily for their first year². The size of the Second Year sample is 1018 while the size of the Third Year sample is 1030.

The samples described in Table 1 can be considered along two dimensions, both of which have a bearing on student performance and progression. The first dimension relates to the subject of study. Essex Business School is distinctive for having a large finance faculty and a management faculty that is dominated by academics working within a Critical Management Studies tradition³. Consequently we can differentiate between on the one hand BSc Finance, BSc Banking and Finance, and BSc Accounting and Finance, each of which contain a fairly high level of quantitative modules, and on the other BSc Business Management and BSc Management and Marketing which after the first year are entirely discursive. We exclude joint degrees which include a combination of both quantitative and discursive modules.

Table 1: Sample characteristics, by subject

	Second year		Third year	
	Quantitative courses	Discursive courses	Quantitative courses	Discursive courses
A-level	134	123	95	93
BTEC	62	62	50	50
Europe	163	154	121	123
Overseas A-level	71	22	53	12
Chinese	29	5	22	2
Non-Chinese	42	17	31	10
Foundation	95	41	62	29
Chinese	64	21	43	12
Non-Chinese	31	20	19	17
Diploma	0	0	132	24
Chinese	0	0	114	15
Non-Chinese	0	0	18	9
2+2	0	0	92	32
Other overseas	65	26	45	17
Chinese	33	6	23	4
Non-Chinese	32	20	22	13
total	590	428	650	380

Note: Quantitative courses are BSc Finance, BSc Banking and Finance, BSc Accounting and Finance, BSc Accounting, BSc Accounting with Economics. Discursive courses are BSc Management, BSc Management and Marketing. Joint degrees between finance and management or accounting and management are excluded from the sub-samples as are the relatively small management science degrees.

The second dimension regards the origin of the student and their previous educational experience. The ability of students to adapt to a university education will depend on their educational capital which is related not just to

their country of origin but also the type of pre-university education. When categorising students, we are guided by whether the disaggregation produces clearly identifiable groupings which are of sufficient size to make analysis meaningful. In some cases the resulting sub-groups will be fairly heterogeneous, but it is important that students within the sub-groups share some common features which are likely to influence subsequent performance and the ability to adapt to higher education in the UK.

A simple distinction can be made for UK students between those who previously studied A-levels, which have traditionally been seen as academic qualifications that prepare students for progressing to university, as opposed to BTEC courses which are vocational in nature and can be generalised as having more supportive structures with a greater reliance on coursework rather than exams. Accordingly we use the label 'A-level' in Table 1 to refer to UK students who enter university having previously studied A-levels or similar academically oriented courses such as the International Baccalaureate, while 'BTEC' refers to UK students whose previous qualification was a BTEC, or some combination of BTEC and A-levels where the A-level grades were not sufficient on their own to warrant entry, or a similar non-mainstream qualification.

Overseas students can be usefully categorised in a number of ways. A large number of overseas students in our sample studied British A-levels, usually but not necessarily in the UK, prior to entry to university. On the one hand, this suggests a familiarity with the English language and British educational system which should be of benefit to them and suggest less of a tendency towards a latent performance gap, but on the other hand a close inspection of the A-levels taken by these students reveal they are often concentrated on highly technical subjects which require less discursive skills. A-level subjects chosen by overseas students commonly include: Mathematics, Further Mathematics, Chemistry, and, perhaps most strikingly, they also often include a language A-level for their first language; it is common to find Chinese students with Chinese A-levels and Russian students with Russian A-levels, both usually with A grades.

Another large sub-group consists of overseas students whose previous qualification was a UK based foundation programme. Such programmes are common throughout the UK and include those run by independent colleges as well as by universities. Students who enter via this route have the advantage of gaining familiarity with the UK system and adapting to life in the UK prior to entry to the first year of a university course. However, a common reason for why they have studied a foundation course is that their school leaving qualifications were not sufficient to warrant direct entry to university⁴.

There remain two other distinct routes to a business school degree, both offering direct entry to the second year. As with foundation courses, many universities run diplomas that are designed for international students to study the

² The third year sample includes students who enter directly into our second year, usually from diploma programmes or via 2+2 link agreements. These categories of students are considered separately in some of the analysis below.

³ This excludes a Management Science group which is based at a separate campus.

⁴ This is a complex issue since for students from some countries, including China, the high school leaving certificate is not regarded as sufficient for entry to a British university and a further year of study is required with foundation courses being one option, particularly for students from affluent families.

equivalent of the first year of a business school alongside English for Academic Purposes. These diplomas recruit students who have not obtained sufficient achievement in either their academic or English studies or both. In contrast, a fairly large number of students come via institutional agreements as part of what has been labelled 2+2 programmes. Students coming via this route have studied two years at an overseas institution, usually in China, on a course that was specifically designed to prepare the student for entry into the second year of a UK business school. On the one hand, good 2+2 programmes have been carefully designed to prepare students for study in the UK, on the other the students forego the comparatively gentle subject level and study skills preparations essential for independent learning along with the gradual acclimatising experienced by Freshers.

This leaves two categories that are more loosely defined: Europe and Other Overseas. Students from Europe (EU and non-EU) are bunched together since although they tend to be more familiar with English language and culture, there is no obvious way to further differentiate between them because no single country or group of countries dominates. Similarly, the category Other Overseas includes all non-European students who are not included in any other category but have the common characteristic of not having previously studied in the UK.

Relation between the years

Scatter plots of the current grade against the previous year's grade are presented in Figures 1 and 2. There is a clear positive relationship with the exception of outliers located in the south-west quadrant of the graph where some students have progressed and have subsequently experienced a collapse in their performance. The accommodation of outliers within regression analyses is a well-known problem since on the one hand outliers can be considered as containing important information about extreme outcomes which we should take care not to lose, but on the other hand outliers can exert a disproportionate impact on the estimators. One approach is to accommodate the outliers by adopting a log-transformation which would help to achieve a fit that goes some way to capturing the effect of the outliers but in our case this would come at the cost of forcing a non-linear relationship through the entire sample.

A visual inspection of the outliers indicates that most of those students who perform very poorly in a given year usually progressed to that year with low or moderately low grades, hence their position in the south-west quadrant of Figures 1 and 2. A closer inspection of details of individual cases shows that students with very low grades have usually partially completed their studies, with their year grade consisting of marks from some term-time assessments combined with zero grades for end of year exams. Such a profile indicates the student has effectively disengaged before they completed the year with the cause of that disengagement usually being non-academic in nature. In view of this the results presented in this paper are based on a sample that excludes outliers defined as students who achieve less than 30 during the year in question. The

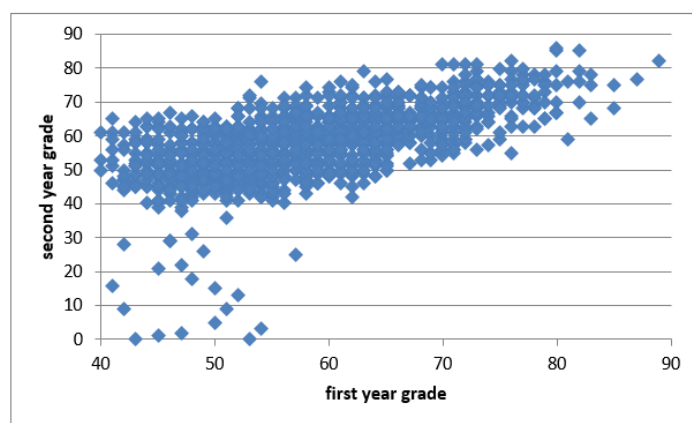


Figure 1: The relationship between second and first year grades

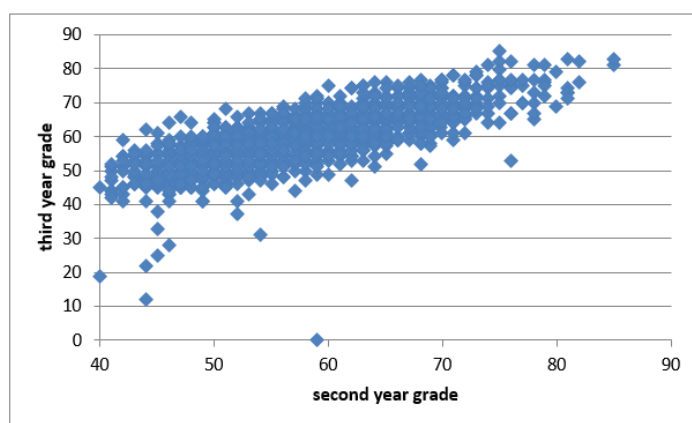


Figure 2: The relationship between third and second year grades

number excluded by this rule is 16 from the second year sample and 5 from the third year sample, 1.6% and 0.5% of the respective samples. In unreported results we conduct the same estimations using the entire sample; in all cases the results are qualitatively unchanged.

Results

Our initial regression results reported in Table 2 uses very broad categories of students that enable a simple comparison of the trajectories Chinese students with others large categories. The base is all UK students and three dummy variables are defined for all students from Europe, Chinese students, and all other overseas students⁵. While these are clearly defined groupings, they are nevertheless fairly heterogeneous and represent a starting point for our analysis. Our data covers four cohorts in the case of the Second Year sample and three in the case of the Third Year sample which for ease of exposition and to improve the power of the hypotheses tests we combine in the same regression. In unreported results, separate regressions for each cohort produced qualitatively similar results. There is,

⁵ In this paper we follow the convention within UK HE of referring to overseas as non-European with one important distinction; our definition of Europe is based on geographical boundaries rather than political. It is consequently larger than the EU with the largest difference due to the inclusion of Norwegian students as European rather than Overseas.

nevertheless, a cohort effect which is adequately accounted for with the inclusion of cohort dummy variables.

Table 2: Regression results, aggregate data

	Discursive		Quantitative	
	Second year	Third year	Second year	Third year
First year grade	0.514*** (0.03)		0.874*** (0.03)	
Second year grade		0.821*** (0.04)		0.726*** (0.02)
Europe	-3.411*** (0.58)	-1.069* (0.59)	-0.763 (0.65)	1.601** (0.63)
Chinese	-6.961*** (1.02)	-2.383*** (0.78)	-0.087 (0.71)	-1.433*** (0.52)
Other overseas	-5.564*** (0.79)	-2.408*** (0.81)	-2.678*** (0.72)	-1.717** (0.67)
Female	2.186*** (0.52)	0.622 (0.50)	-0.119 (0.51)	1.201*** (0.41)
2011 dummy	0.043 (0.77)		4.958*** (0.75)	
2012 dummy	-0.666 (0.78)	2.194*** (0.63)	-0.757 (0.76)	-0.521 (0.49)
2013 dummy	3.015*** (0.80)	2.690*** (0.65)	2.878*** (0.73)	0.992* (0.51)
Intercept	28.780*** (1.84)	12.707*** (2.35)	4.376** (1.86)	17.381*** (1.34)
t-stat china – other OS	1.21	-0.03	-3.21***	-0.47
Observations	421	378	581	647
R ²	0.530	0.644	0.646	0.686
adj R ²	0.521	0.637	0.641	0.682

Notes: Standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

Our primary focus is on the coefficients for the dummy variables which represent the difference in grade achieved by the respective sub-sample relative to a UK student conditional on the grade achieved during the previous year. The results show that a divergence of performance is not exclusive to Chinese students and the magnitude of the divergence depends on the subject studied. The size of the performance divergence is meaningful, especially for discursive subjects, and is most pronounced in the second year. On average, Chinese students underperform UK students on discursive courses by -6.96 marks during the second year conditional on their first year grade with non-Chinese overseas students underperforming by -5.56 marks, both of these differentials are statistically significant. This conditional performance divergence reduces in the third year to -2.38 and -2.41 marks respectively for Chinese and non-Chinese overseas students, but remains statistically significant. For both second and third year performance, the differences in performance divergence experienced by Chinese and non-Chinese overseas students are not statistically significant. Performance divergence for European students studying discursive courses is also significant but is not so pronounced, with a differential of -3.41 during the second year and -1.07 in the third year, with the latter only significant at the 10% level.

The picture is qualitatively and quantitatively different for performances on quantitative courses. The conditional performance of Chinese students is no different to UK students during the second year but they experience a significant performance divergence of -1.43 in the third year. By contrast, non-Chinese overseas students experience a significant performance divergence in both the second and third years of -2.68 and -1.72 respectively, with the second year performance divergence also being significantly

different to that experienced by Chinese students. Finally, the conditional performance of European students is not significantly different from UK students in the second year and is significantly positive in the third year indicating that conditional on their second year grade, European students outperformed UK students by an average of 1.60 marks during the final year of the degree.

Further disaggregation

To further examine the relationship between previous educational experience and performance divergence for the regressions reported in Table 3 we use dummy variables that correspond to the categories described above and listed in Table 1. Using the base as UK students who entered university with A-levels, we have a further seven categories of students for whom we could envisage different rates of progression. Of those seven, one, 2+2 students, includes exclusively Chinese students, while four others, overseas students with A-levels, foundation students, diploma students, and other overseas students, include both Chinese and other overseas students. To test whether performance divergence is most acute for, or even unique to, Chinese students we also interact these dummy variables with a dummy variable signifying whether the student is Chinese. For example, a significant coefficient for foundation indicates performance divergence for students who entered via a foundation course while a significant coefficient for foundation×Chinese indicates an additional performance divergence for Chinese students who came onto the degree via a foundation course. This distinction is made for all categories with the exception of overseas A-level and other overseas studying discursive courses due to the small number of Chinese students in these categories (see Table 1).

The coefficients for each sub-category are predominantly negative, confirming that UK A-level students represent a useful base for comparative purposes. On the whole, the conditional performance of BTEC students was comparable to the base of A-level students with the exception of the second year of management courses for which there is a significant divergence of -2.08 marks. There is a more pronounced gap for European students, again restricted to those students studying management courses, with the conditional performance being -4.08 marks below the base for the second year and -1.45 in the third year.

The results for non-European overseas students are in many ways more interesting, both because of the magnitudes of the coefficients but also because of the patterns that are evident. Broadly speaking, overseas students tend to experience a lower conditional performance with the size of the decline greater for discursive management courses as opposed to more quantitative accounting and/or finance courses, and the bulk of the divergence takes place during the second year. Where there is a difference between Chinese and non-Chinese students, Chinese students tend to have a smaller performance divergence than their fellow non-Chinese students.

Table 3: Regression results, disaggregated data

	Discursive		Quantitative	
	Second year	Third year	Second year	Third year
First year grade	0.514*** (0.03)		0.876*** (0.03)	
Second year grade		0.814*** (0.04)		0.722*** (0.02)
BTEC	-2.077** (0.83)	-1.098 (0.85)	0.528 (0.93)	-1.375 (0.89)
Europe	-4.079*** (0.63)	-1.451** (0.66)	-0.568 (0.70)	1.136 (0.69)
Overseas A-level	-7.721*** (1.20)	-3.618** (1.47)	-2.551** (1.05)	-1.554 (1.04)
Overseas A-level×Chinese			3.769** (1.46)	1.090 (1.40)
Foundation	-6.773*** (1.24)	-3.470*** (1.29)	-0.925 (1.19)	-3.863*** (1.26)
Foundation×Chinese	-0.214 (1.63)	-0.513 (1.77)	-0.838 (1.30)	0.883 (1.38)
Other overseas	-5.706*** (1.13)	-1.129 (1.26)	-3.964*** (1.16)	-2.679** (1.19)
Other overseas ×Chinese			6.663*** (1.47)	1.468 (1.52)
Diploma		-4.516*** (1.66)		-0.950 (1.29)
Diploma×Chinese		2.691 (1.98)		-0.818 (1.27)
2+2		-2.693** (1.05)		-2.108*** (0.74)
Female	2.111*** (0.52)	0.549 (0.51)	-0.275 (0.51)	1.136*** (0.41)
2011 dummy	0.236 (0.77)		4.836*** (0.75)	
2012 dummy	-0.394 (0.78)	2.381*** (0.63)	-0.940 (0.76)	-0.428 (0.50)
2013 dummy	3.077*** (0.80)	2.796*** (0.66)	2.755*** (0.73)	1.042** (0.51)
Intercept	29.381*** (1.88)	13.430*** (2.42)	4.277** (1.91)	18.075*** (1.43)
Observations	421	378	581	647
R ²	0.538	0.651	0.657	0.691
adj R ²	0.526	0.638	0.649	0.683

Notes: Standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%

One of the most striking results from Table 3 relates to the performance of overseas students who studied A-levels. A performance gap develops for these students during the second year, with coefficients of -2.55 for students studying quantitative courses and -7.72 for students studying discursive courses. The gap continues into the final year for students on discursive courses whose grades are on average 3.62 points lower than UK A-level students conditional on their second year grade. For overseas A-level students studying quantitative courses, the performance gap is only evident for non-Chinese students since there is a positive coefficient of 3.77 for Chinese students which offsets the negative coefficient for all students indicating that whereas the performance of non-Chinese students in this category dropped during the second year relative to their first year results, the results for Chinese students in the same category did not drop. Indeed, there is no performance gap in either the second or third year for Chinese students who studied A-levels. These results can be understood when it is recalled that the typical profile of an overseas student who took A-levels usually achieved very good A-level grades for highly quantitative subjects so they are well equipped to adapt to quantitative major, but they dramatically underperform when they major in discursive subjects.

Students from foundation programmes find the transition to higher levels of study challenging for discursive courses, with a conditional performance gap of -6.77 for second year and -3.48 for third year, but a significant gap of -3.86 only appearing in the Third Year for students studying quantitative

courses. There is no significant difference between Chinese and non-Chinese students who entered university via a foundation course.

Chinese 2+2 students who enter directly into the second year of a course underperform during the third year relative to the second year irrespective of the subject they are studying, by -2.11 for quantitative, and -2.70 for discursive courses. The other group of students who enter direct into the second year are those who previously studied for a diploma. These students only experience a conditional underperformance if they are studying discursive courses and the underperformance is more pronounced for non-Chinese students relative to Chinese for which there is a large differential of +2.69 which is nevertheless insignificant.

The final category, other overseas, relates to overseas students who enter the first year of the degree without having previously studied in the UK. Perhaps surprisingly although the progression trajectories of these students tend to diverge below that of the base, the divergence for those students studying discursive topics is not as great as that experienced by overseas A-level or foundation students. Most strikingly, the trajectory of Chinese students in this category who are studying quantitative courses keeps up with, if not exceeds, that of UK A-level students.

Cumulative progression trajectories

In Table 4 we present the cumulative results for each category of student by combining the second and third year divergence coefficients as reported in table 3. Presenting the results in this format has the advantage of allowing for the fact that students may progress at different rates across the three years. Attention should be focused on the top five rows since these students have progressed across three years, the inclusion of diploma and 2+2 students in rows six and seven is for completeness.

Table 4: cumulative progression trajectories

	Discursive courses		Quantitative courses	
	non-Chinese	Chinese	non-Chinese	Chinese
BTEC	-3.175		-0.847	
Europe	-5.530		0.568	
Overseas A-level	-11.339		-4.105	0.751
Foundation	-10.243	-10.97	-4.788	-4.743
Other overseas	-6.835		-6.643	1.488
Diploma	-4.516	-1.825	-0.950	-1.768
2+2		-2.693		-2.108

The most interesting results from Table 4 relate to the categories for overseas students: foundation, overseas A-level and other overseas. The relative progression of non-Chinese students within these categories is similar within each subject. For quantitative courses, the range within which conditional grades diverge from the base lies between -4.11 and -6.64. There is a greater range of results for discursive courses with the results lying between -6.84 and 11.34. This confirms the importance of subject studied in determining progression trajectories.

Conclusions

In this paper we have compared the performance trajectories of different groups of students in order to test whether previous educational experience can explain diverging performances. We find that students who complete the first year of their programme with identical grades will subsequently experience a systematic divergence of performance that depends on the subject they are studying and their previous educational experience. For discursive courses, all groups of students, including UK students who entered university with BTEC qualifications, experience a performance trajectory that falls short of that achieved by UK students who entered with A-levels. This divergence is most pronounced for overseas students for whom there is a cumulative shortfall during the second and third years of their degree of up to -11 marks.

The picture is somewhat different for quantitative courses for which there are more modest differences in performance trajectories and the lower trajectories are only experienced by some overseas students. Most strikingly, Chinese students either experience trajectories that are not significantly different to non-Chinese students within the same category or are markedly better. Indeed, the cumulative trajectories of Chinese students who either entered the first year of a quantitative degree directly from a Chinese institution or having passed A-levels are little different or even superior to the baseline trajectory of British students who previously studied A-levels.

While some of the categories used in the study are fairly heterogeneous, categories such as BTEC and foundation are relatively homogeneous with students sharing similar educational experiences and being admitted on the same entry requirement irrespective of whether they are studying for a quantitative or discursive degree. It is therefore instructive to compare the results for these groups. British students who previously studied BTEC progress at approximately the same rate as British students who previously studied A-levels if they choose quantitative courses but their progression diverges by a cumulative average of -3.18 if they study discursive courses. By contrast, overseas students who entered university after taking a UK-based foundation course experienced a divergence of performance irrespective of whether they studied for a quantitative or a discursive course, but the divergence for the latter was on average twice that of the former.

We suggest that differing progression trajectories can be viewed within a threshold concept framework which highlights the discursive nature, broadly defined, of transformative concepts. Although this is not a fully formed position and requires further research, the importance of subject specific language skills in determining progression trajectories is evident in our results. We suggest that if the subject threshold concepts need to be articulated within a sophisticated discursive vocabulary then this poses a particular challenge to students for whom English is not their first language. However, if threshold concepts are at least in part articulated by a mathematical or statistical language then overseas students are less likely to see a lower progression trajectory. For this reason, the finding that Chinese students

within the other overseas category who enter the first year of a UK quantitative degree direct from a Chinese institution tend to progress at the same rate as UK A-level students should not be a surprise because the technical skills of these students tend to be of a high standard. Similarly, the typical profile of a Chinese student who has studied A-levels in the UK is that they achieved very high grades in quantitative and technical A-levels which indicate that they are prepared for higher education so long as they choose quantitative majors. By contrast, the profile of Chinese students who register for foundation courses based in the UK tends to be weaker in comparison to A-levels, so foundation students struggle to make the same advances during their degree.

In addition to contributing to our understanding of student performance, the results have policy implications. For recruitment and curriculum design, it is important that overseas students sign up for degrees that enable them to flourish. It is usually assumed that this comes about through a self-selection process as students choose courses on subjects they are interested in and have skills to match but this is often not the case for business degrees where students often choose a degree at a business school because it is believed to be a way in to a career rather than due to an interest in the subject. As a consequence, students are less likely to consider the suitability of courses which can be problematic given the variety of ways in which business is approached within universities, ranging from degrees in finance or management science which require skillsets that are not dissimilar to those required by an economics degree, through to degrees designed from a critical management perspective which, although multi-disciplinary, tend to be quants-free zones.

The second area for policy prescription relates to the targeting of support. By focusing on trajectories we have shown how early promise is not always fulfilled and that overseas students tend to struggle to progress at the same rate as many UK students, particularly if there is a high discursive component to the degree. This demonstrates that it is not enough to focus the provision of study skills support during the first year and there is a continuing if changing need for targeted support through the second and third years.

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